

IN THE U.S. PATENT AND TRADEMARK OFFICE

Appl. No. : 10/810,924
Applicant : Kopra, Toni et al
Filed : March 26, 2004
TC/AU : 2617
Examiner : Sams, Matthew C.

Docket No. : 872.0180.U1(US)
Customer No. : 29683
Confirmation No.: 9401

Title : FEATURE EXTRACTION IN A NETWORKED PORTABLE DEVICE

PROPOSED TELEPHONE INTERVIEW AGENDA

Attendees:

Examiner Matthew Sams

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Date and Time: March 31 (Tuesday) 2009 at 1 PM

AMENDMENTS TO THE CLAIMS:

This listing of the claims will replace all prior versions, and listings, of the claims in this application:

Listing of Claims:

1. (Currently Amended) An apparatus comprising:
 - an interface configured to receive a media sample;
 - a processor configured to extract a first set of lower level but not higher level features from a digital version of the media sample;
 - a transmitter configured to transmit the extracted first set of lower level but not higher level features over a wireless communication link,
 - a receiver configured to receive over the wireless communication link a request message that requests at least one additional feature;
 - wherein the processor is further configured to respond to the request message to extract a second set of lower level but not higher level features from the digital version of the media sample and to transmit the extracted second set of lower level but not higher level features over the wireless communication link to a remote service for any necessary higher level feature extraction and for matching based on the first and second sets of lower level but not higher level features, wherein the receiver is configured to receive notification as to identification of a media corresponding to the media sample from the remote service.
2. (Previously Presented) The apparatus of claim 1 wherein the interface comprises a transducer.
3. (Previously Presented) The apparatus of claim 2 wherein the transducer comprises a microphone and the media sample comprises an audio sample.
4. (Previously Presented) The apparatus of claim 2 wherein the transducer comprises a camera and the media sample comprises a visual sample.

5. (Previously Presented) The apparatus of claim 1 wherein the interface comprises one of a cable and a wireless link.

6. (Previously Presented) The apparatus of claim 5 wherein the media sample that the interface receives is the digital version.

7. (Previously Presented) The apparatus of claim 1 wherein said transmitter is further configured to transmit a message that includes the at least one extracted lower level but not higher level feature and no portion of the digital version of the media sample.

8. (Previously Presented) The apparatus of claim 1 wherein the processor is further configured to adaptively select a number of lower level but not higher level features to extract based on the digital version of the media sample.

9. (Previously Presented) The apparatus of claim 1 wherein the processor is further configured to adaptively select at least one type of feature to extract based on the digital version of the media sample, the processor extracts at least one feature of the adaptively selected type, and wherein the transmitter is further configured to transmit an identifier of the selected type of feature.

10-11. (Canceled)

12. (Previously Presented) The apparatus of claim 1 further comprising a user interface configured to cause the transmitter to transmit the first set of lower level but not higher level features, and a buffer configured to store at least a portion of the digital version of the media sample, wherein the processor extracts at least some of the first set prior to a user input at the said user interface.

13-15. (Canceled)

16. (Previously Presented) The apparatus of claim 1 further comprising a user interface by which a single user input initiates: the processor to extract the first set of lower level but not higher level features, a wireless communications link to be established between the MS and a communication service, and the extracted first set of lower level but not higher

level features to be transmitted over the wireless communications link.

17. (Previously Presented) The apparatus of claim 16 wherein the single user input further initiates a buffer disposed between the transducer and the processor to begin storing at least a portion of the digital version of the media sample.

18. (Previously Presented) The apparatus of claim 1 wherein the first and second sets of features comprise MPEG-7 descriptors.

19. (Previously Presented) The apparatus of claim 1 wherein the first set of lower level but not higher level features is non-reconstructive of the digital version of the media sample.

20. (Previously Presented) The apparatus of claim 1 wherein the first and second sets of features, in combination, are non-reconstructive of the digital version of the media sample.

21. (Canceled)

22. (Previously Presented) The apparatus of claim 1, wherein the request message specifically identifies each additional feature at least by type, and the second set of features comprises only features of the said identified type.

23. (Currently Amended) A computer readable medium embodied with a computer program comprising:

a first set of computer instructions to extract in response to a user input on a device a first set of lower level but not higher level features from a digital media sample, and to extract in response to a received request message to the device from a remote service, through wireless communications, a second set of lower level but not higher level features consistent with at least one additional feature requested in the request message;

a second set of computer instructions to transmit in separate messages the first and second sets of extracted lower level but not higher level features over a wireless communications link to a remote service for any necessary higher level feature extraction and for matching based on the first and second sets of lower level but not higher level features; and

a third set of computer instructions for receiving a notification of identification of a media corresponding to the media sample from the remote service.

24. (Previously Presented) The computer readable medium of claim 23 wherein said separate messages comprise features but no portion of the digital media sample.

25. (Previously Presented) The computer readable medium of claim 23 wherein the request message specifies a number of additional features, and the first set of computer instructions is to adaptively select the second set of features comprising the specified number.

26. (Previously Presented) The computer readable medium of claim 23 wherein
the first set of computer instructions is to adaptively select a type of feature to extract based on the request message and to extract the first set of features of the adaptively selected type.

27. (Previously Presented) The computer readable medium of claim 23 wherein
the first set of computer instructions is to extract the first set of features from a first time-bounded segment of the digital media sample, and
the second set of computer instructions is to transmit a second time-bounded segment and not the first time-bounded segment with the first set of features.

28-29. (Canceled)

30. (Previously Presented) The computer readable medium of claim 23 wherein the at least one feature defines a timepoint, the first set of computer instructions is to extract at least one timepoint from the digital media sample, and one of said messages comprises a timepoint, a spectral slice of the digital media sample and an identifier that links the spectral slice to the timepoint.

31-34. (Canceled)

35. (Previously Presented) The computer readable medium of claim 23 wherein the first set of features is non-reconstructive of that digital media sample.

36. (Canceled)

37. (Currently Amended) A computer readable medium embodied with a computer program comprising:

a first set of computer instructions to receive over a network to a remote service from a device through wireless communications a first message that includes a first set of received lower level but not higher level features;

a second set of computer instructions to search a database of feature sets for all matching sets that match the first set of received features and to determine at least one additional feature that distinguishes among each of the matching sets;

a third set of computer instructions to transmit over the network a request message that stipulates the at least one additional feature, the first set of computer instructions further to receive over the network a second message that includes a second set of received lower level but not higher level features in response to the request message that stipulates the at least one additional feature; and

a fourth set of computer instructions to uniquely identify one feature set from among the matching sets using the second set of received features through any needed extraction of higher level features ~~from the received lower level features at the remote service if a unique match is not found from the received lower level features transmitted by the device~~ wherein an iterative loop is performed in which a Kth higher level feature is extracted using the second set of received lower level features, addresses of a stored feature set are searched using the Kth higher level feature, and the addresses of the feature sets of the Kth higher level feature are stored until a unique match is determined, where K is natural number from 1 to a maximum number of higher level features.

38. (Previously Presented) The computer readable medium of claim 37 wherein each feature set is associated with a media file title, the computer program further comprising a fifth set of computer instructions to transmit, over the network to a sender of the message, a reply message that includes the media file title.

39. (Canceled)

40. (Previously Presented) The computer readable medium of claim 38 wherein the fourth set of computer instructions further is to determine a link address for a media file uniquely associated with the uniquely identified feature set, and wherein the fifth set of computer instructions is further to transmit the link address in the reply message.

41-46. (Canceled)

47. (Previously Presented) The computer readable medium of claim 37 wherein the request message includes at least one of a number of additional features and a type of the at least one additional feature.

48. (Currently Amended) An apparatus comprising:

means for receiving a media sample;

processing means for extracting at least one feature from a digital version of the media sample, said processing means responsive to a user input to extract a first set of lower level but not higher level features and responsive to a request message identifying at least one additional feature to extract a second set of lower level but not higher level features consistent with the identified at least one additional feature;

means for transmitting the first and second sets of lower level but not higher level features in separate messages over a wireless communication link to a remote service for any necessary higher level feature extraction and for matching based on the first and second sets of lower level but not higher level features; and

means for receiving the request message through wireless communications and for receiving notification of an identification of a media corresponding to the media sample from the remote service.

49. (Previously Presented) The apparatus of claim 48, wherein the means for receiving a media sample comprises a transducer, and the means for extracting comprises a digital processor.

50. (Currently Amended) A method comprising:

at a portable wireless device, receiving a media sample;

at the portable wireless device, extracting a first plurality of lower level but not higher level features from a digital version of the media sample;

transmitting from the portable wireless to a remote service device a message that includes the extracted first plurality of lower level but not higher level features;

receiving at the portable wireless device a request message requesting at least one additional lower level but not higher level feature;

at the portable wireless device, extracting at least one extra lower level but not higher level feature consistent with the request message;

transmitting from the portable wireless device a message that includes the extracted extra lower level but not higher level feature to the remote service for any necessary higher level feature extraction and for matching based on the first and second sets of lower level but not higher level features; and

receiving a notification of identification from the remote service.

51. (Previously Presented) The apparatus as in claim 1, further comprising a button configured, when pressed, to initiate identification of media from the media sample.

52. (Previously Presented) The computer readable medium of claim 23, further comprising initiating identification of media from the media sample through activating a button for identification of media.

53. (Previously Presented) The apparatus of claim 48, further comprising a button configured, when pressed, to initiate identification of media from the media sample.

54. (Previously Presented) The method of claim 50, further comprising initiating identification of media from the media sample through activating a button for identification of media.

55. (Previously Presented) The method of claim 54, further comprising providing a link, after the remote service identifies the media, that, when pressed, accesses a music service for downloading the media.

56. (Currently Amended) An apparatus comprising:

a receiver configured to receive over a network from a device a first message that includes a first set of lower level but not higher level features extracted from a media sample;

a transmitter configured to request over the network from the device at least one additional feature in a request message, wherein the receiver is configured to receive over the network from the device a second message responsive to the request message, the second message including a second set of lower level but not higher level features extracted from the media sample; and

a processor configured to use the received lower level but not higher level features to identify a media corresponding to the media sample and, if needed, configured to extract higher level features from the received lower level but not higher level features to identify the media corresponding to the media sample, wherein an iterative loop is performed in which a Kth higher level feature is extracted using the second set of received lower level features, addresses of a stored feature set are searched using the Kth higher level feature, and the addresses of the feature sets of the Kth higher level feature are stored until a unique match is determined, where K is natural number from 1 to a maximum number of higher level features, wherein the transmitter is configured to transmit a notification of identification of the media sample to the device.

57. (Currently Amended) A method comprising:

receiving at a remote service from a device through a network ~~wireless communications~~ a first message that includes a first set of received extracted lower level but not higher level features from a media sample;

searching a database of feature sets for all matching sets that match the first set of received extracted lower level but not higher level features and determining at least one additional feature that distinguishes among each of the matching sets;

transmitting over the network a request message that stipulates the at least one additional feature;

receiving over the network a second message that includes a second set of received extracted lower level but not higher level features in response to the request message that stipulates the at least one additional feature; and

uniquely identifying one feature set from among matching sets using the received lower level features through any needed extraction of higher level features from the received extracted lower level but not higher level features if a unique match is not found from the received extracted lower level but not higher level features, wherein an iterative loop is performed in which a Kth higher level feature is extracted using the second set of received lower level features, addresses of a stored feature set are searched using the Kth

higher level feature, and the addresses of the feature sets of the Kth higher level feature are stored until the unique match is determined, where K is natural number from 1 to a maximum number of higher level features.

58. (New) The apparatus of claim 56, wherein the first and second messages comprise the at least one extracted lower level but not higher level feature and no portion of the digital version of the media sample.

59. (New) The apparatus of claim 56, wherein the network comprises a wireless communications link established between the apparatus and the device, and the extracted first set of lower level but not higher level features are received over the wireless communications link.

60. (New) The apparatus of claim 56, wherein the first and second sets of lower level but not higher level features comprise MPEG-7 descriptors.

61. (New) The apparatus of claim 56, wherein the first set of lower level but not higher level features is non-reconstructive of a digital version of the media sample.

62. (New) The apparatus of claim 56, wherein the first and second sets of lower level but not higher level features, in combination, are non-reconstructive of the digital version of the media sample.

63. (New) The apparatus of claim 56, wherein the request message specifically identifies each additional feature at least by type, and the second set of lower level but not higher level features comprises only features of the said identified type.

64. (New) The method of claim 57, wherein the first and second messages comprise the at least one extracted lower level but not higher level feature and no portion of the digital version of the media sample.

65. (New) The method of claim 57, wherein the network comprises a wireless communications link established between the apparatus and the device, and the extracted first set of lower level but not higher level features are received over the wireless

communications link.

66. (New) The method of claim 57, wherein the first and second sets of lower level but not higher level features comprise MPEG-7 descriptors.

67. (New) The method of claim 57, wherein the first set of lower level but not higher level features is non-reconstructive of a digital version of the media sample.

68. (New) The method of claim 57, wherein the first and second sets of lower level but not higher level features, in combination, are non-reconstructive of the digital version of the media sample.

69. (New) The method of claim 57, wherein the request message specifically identifies each additional feature at least by type, and the second set of lower level but not higher level features comprise only features of the said identified type.

70. (New) A system comprising:

a mobile station; and

a remote service, wherein

the mobile station comprises

an interface configured to receive a media sample;

a first processor configured to extract a first set of lower level but not higher level features from a digital version of the media sample;

a first transmitter configured to transmit the extracted first set of lower level but not higher level features over a wireless communication link to the remote service,

a first receiver configured to receive over the wireless communication link a request message that requests at least one additional feature;

wherein the first processor is further configured to respond to the request message to extract a second set of lower level but not higher level features from the digital version of the media sample and to transmit the extracted second set of lower level but not higher level features over the wireless communication link to the remote service for any necessary higher level feature extraction and for matching based on the first and second sets of lower level but not higher level features, wherein the first receiver is configured to

receive notification as to identification of a media corresponding to the media sample from the remote service, wherein the remote service comprises

- a second receiver configured to receive over a network from the mobile station a first message that includes a first set of lower level but not higher level features extracted from the media sample;

- a second transmitter configured to request over the network from the mobile station at least one additional feature in a request message, wherein the second receiver is configured to receive over the network from the mobile station a second message responsive to the request message, the second message including a second set of lower level but not higher level features extracted from the media sample; and

- a second processor configured to use the received lower level but not higher level features to identify a media corresponding to the media sample and, if needed, configured to extract higher level features from the received lower level but not higher level features to identify the media corresponding to the media sample, wherein an iterative loop is performed in which a Kth higher level feature is extracted using the second set of received lower level features, addresses of a stored feature set are searched using the Kth higher level feature, and the addresses of the feature sets of the Kth higher level feature are stored until a unique match is determined, where K is natural number from 1 to a maximum number of higher level features, wherein the second transmitter is configured to transmit a notification of identification of the media sample to the mobile station.

Remarks/Arguments:

Claims 1-9, 12, 16-20, 22-27, 30, 35, 37, 38, 40, and 47-70 are currently pending. Claims 1, 23, 37, 48, 50, 56, and 57 have been amended for clarification and are supported by the original claims and Figures 3A and 3B and paragraphs 0051-0054. Claims 58-70 have been added to enhance the scope of Applicant's patent coverage and are supported by the original claims, Figures 3A and 3B, and paragraphs 0051-0054 and 0060 of the application as filed. It is respectfully submitted that no new matter has been added.

Response to arguments on pages 2-3 of the Office Action dated December 23, 2008

Claims 1, 23, 48, and 50 recite, identically or similarly, as follows: "the extracted second set of lower level but not higher level features over the wireless communication link to a remote service for any necessary higher level feature extraction and for matching based on the first and second sets of lower level but not higher level features." This amendment of claims 1, 23, 48, and 50 should more clearly distinguish the claimed invention from the cited references of Wang and Barton.

Claims 37, 56, and 57 have been more amended to more clearly distinguish from the cited references of Wang, Barton, and/or Vetro, and now recite, identically or similarly as follows:

uniquely identify one feature set from among the matching sets using the second set of received features through any needed extraction of higher level features wherein an iterative loop is performed in which a Kth higher level feature is extracted using the second set of received lower level features, addresses of a stored feature set are searched using the Kth higher level feature, and the addresses of the feature sets of the Kth higher level feature are stored until a unique match is determined, where K is natural number from 1 to a maximum number of higher level features

All pending claims are believed to be allowable over the prior art of record.

35 U.S.C. 103(a) rejection

The Patent Office rejected claims 1-9, 12, 16, 17, 22-27, 30, 35, 38, 40, and 47-55 under 35 U.S.C. 103(a) as being unpatentable over Wang, U.S. Patent No. 6,990,453, in view of Barton, U.S. Published Patent Application No. 2002/0072982.

In Applicant's invention, as supported by paragraph 0050, there are an apparatus and a remote service that are configured to perform distributed feature extraction, wherein

the apparatus is configured to perform lower level but not higher level feature extraction and the remote service is configured to perform any needed higher level feature extraction from extracted lower level features transmitted by the apparatus to identify the media from which the lower level features have been extracted. Independent claims 1, 23, and 50 are directed to the apparatus that performs lower level but not higher level feature extraction. Independent claims 37, 48, 56, and 57 are directed to the remote service which performs the higher level feature extraction.

In Wang, landmarks and fingerprints are used to build a database 18. A media sample is captured 12 (Figure 1). Landmarks and fingerprints from the exogenous media sample are computed 14 and matched 16 through use of the database 18. Correspondences are generated 20 and a winning media sample file is located 22.

Wang discloses a sound source continually sampled into a buffer (column 21, lines 64-67). Sound parameters may be extracted from a sound buffer into fingerprints or other intermediate feature-extracted forms and stored in a second buffer (column 22, lines 19-21). New fingerprints may be added to the front of the second buffer while old fingerprints are discarded from the end of the buffer to form a rolling buffer (column 22, lines 22-24).

The method of Wang involves a search first performed on a first subset of sound files and only if the first search fails, then a search of second subset of sound files is performed (column 19, lines 23-34). Wang's method does not involve requesting the mobile station to provide a second set of features and does not appear amenable to modification to request a second set of features from the mobile station since the method of Wang involves a first search of highly used sound files only to be followed by a second search of less highly used sound files. Wang does not contemplate a request for a second set of features, as evidenced by Figure 1, in which Wang finds matching fingerprints 16 and then generates correspondences 20 with sample landmarks to find a winning sound file 22.

Furthermore, Wang does not teach an apparatus configured to extract lower level features that may be later used by a separate remote device to extract higher level features off-apparatus to identify a media from a media sample, and does not teach a remote service configured to identify from received lower level features and configured to extract higher level features from the received lower level features to uniquely identify a media corresponding to the media sample. Wang, in column 8, lines 13-24, discloses as follows:

The client end sends a feature-extracted summary of the captured signal sample containing landmark and fingerprint pairs to the server end, which performs the recognition. Sending this feature-extracted summary to the server, instead of the raw captured signal, is advantageous because the amount of data is greatly reduced, often by a factor of 500 or more. Such information can be sent in real time over a low-bandwidth side channel along with or instead of, e.g., an audio stream transmitted to the server. This enables performing the invention over public communications networks, which offer relatively small-sized bandwidths to each user.

In Wang, the feature extraction is disclosed as occurring in the client device and the recognition occurs in the server. The computational nodes referenced in column 15, lines 12-14, in Wang correspond to the client side of Wang's system. On the server side, Wang, from column 15, line 59, through column 18, line 50, the extracted features are used to rank candidates; no features are extracted from these features received from the client device.

Claims 1, 23, 48, and 50 recite, identically or similarly, as follows: "the extracted second set of lower level but not higher level features over the wireless communication link to a remote service for any necessary higher level feature extraction and for matching based on the first and second sets of lower level but not higher level features."

Wang does not teach or suggested this claimed subject matter.

The Patent Office from page 4, line 16, through page 5, line 7, of the Office Action dated December 23, 2008, as follows:

In an analogous art, Barton teaches a system for identifying audio samples that includes a recursive feature for automatically requesting more information in order to narrow the search results to find the corresponding file. (Page 5 [0048 and 0049] the "resolution of the derivation is coupled, in large measure, to the level of discrimination required in selecting an event to be triggered. As the number of potentially triggered events increases, the necessity to resolve ambiguity in the sample also increases," Page 6 [0059] "the song excerpt may be increased in length, or a different excerpt may be furnished, in an iterative manner" until a song is identified Page 7 [0067-0068] and Page 11 [0138]) At the time the invention was made, it would have been obvious to one of ordinary skill in the art to implement resolution to resolve ambiguity of Barton. One of ordinary skill in the art would have been motivated to do this since it enables back and forth communication to resolve ambiguity. (Page 5 [0048-0049], Page 6 [0059] and Page 7 [0067-0068])

The Patent Office has made an assertion that “it would have been obvious to one of ordinary skill in the art to implement the mobile station of Wang after modifying it to incorporate the ability to increase resolution to resolve ambiguity of Barton” and “one of ordinary skill in the art would have been motivated to do this since it enables back and forth communication to resolve ambiguity.” Paragraphs 0048, 0049, 0059, 0067, and 0068 of Barton are then referenced.. These five paragraphs are reproduced below:

[0048] Referring again to FIG. 1, the experiential environment sample is received by recognition engine 110 on line 117. Recognition engine 110 derives characteristics of the received sample by using data stored in database 115. Recognition 110 and database 115 are operationally coupled via line 119, as shown in FIG. 1. A variety of derivation methods may be used. In the case of audio samples, the techniques described in Appendix may be used. However, it is noted that the derivation methods that may be used in this invention are not limited to such techniques. The particular derivation method chosen is only required to be able to derive sufficient characteristics from **the experiential environment sample** to enable a predetermined event to be triggered. Thus, the strength or resolution of the derivation is coupled, in large measure, to the level of discrimination required in selecting an event to be triggered. As the number of potentially triggered events increases, the necessity to resolve ambiguity in the sample also increases.

[0049] For example, in the case of the exemplary embodiment where song lyrics corresponding to a broadcast song are sought by a user, a relatively large number of characteristics about **the sample** may be derived and compared against stored data to be able to identify the particular song from the many such songs that may be stored. That is, as more songs are potentially identified, more lyric delivery events are potentially triggered. By comparison, in se vice offerings where are relatively small number of events are potentially triggered, fewer sample characteristics need typically be derived in order to resolve ambiguity as to which event to trigger. Such service offering may include those where a binary "Yes" or "No" event may be triggered as may be the case for customer surveys and voting/polling type services.

[0059] The friends are prompted in the message or call to try to "Name that Tune" by identifying the song's title or artist from the small excerpt. The friend's guesses may be collected by the service provider using a variety of methods, including for example, an interactive web-site, telephone call center, email, or conventional mail. If no one correctly identifies the song, the song excerpt may be increased in length, or a different excerpt may be furnished, in an iterative manner, until a "winner" is determined.

[0067] Block 174 in FIG. 1 shows that control events may also be triggered in response to a sampled experiential environment in accordance with the invention. Control events are those that provide the user with an ability to control or otherwise manipulate information and data, services, or other events in a predetermined manner according to the captured sample received by a service provider. For example, a human resources recruiter may organize a data archive of job candidates and associated demographic data by engaging a service provider that automatically manipulates the data according to web-site images of potential hiring companies that are captured in a frame grabber running on the user's computer and uploaded to the service provider. In such cases, the candidate database can be sorted according to the captured web-document and derived by deriving preselected characteristics such as industry type, key-words in the text elements of the page, and other characteristics.

[0068] Communication events may be triggered in accordance with the invention as depicted by block 175 in FIG. 1. Communication events include, for example, communicative interactions among users, between users and the service provider, or such interactions between users, the service provider, and third parties.

Paragraph 0059 of Barton discloses “the song excerpt may be increased or a different excerpt may be furnished” for a group of friends in a game after the recognition engine 110 identifies the song. Preceding paragraph 0058 of Barton discloses “A game type entertainment event is then triggered by the service to automatically send a small excerpt of the originally recorded song (i.e., not the captured sample of the song) to a pre-determined group of the user's friends via” which clearly shows that Barton does not send a message to the capture device to send a second set of extracted lower level but not higher level features but, rather, selects another portion or excerpt from the captured sample of the song. That is, the song naming game of paragraph 0059 is an illustration of an application when a song has been identified through Barton's invention. Barton's recognition engine 110 does not recursively inquire of the capture device 102 for more information. It seems that there is but one sample passed from the capture device 102 to the recognition engine 110, which sample is then identified from the database 115 associated with the recognition engine.

Also, it is noteworthy that, whereas Barton performs any feature extraction in a remote device (i.e., the recognition 110), in contrast, Wang discloses all feature extraction occurs on the client end (column 8, lines 13-21); polar opposite approaches. Because each of Barton's and Wang's approaches identify the song/ file,

there is no distributed feature extraction as in each and every one of the pending independent claims.

Barton, like Wang, does not teach the subject matter of claims 1, 23, 48, and 50 which recite, identically or similarly, as follows: “the extracted second set of lower level but not higher level features over the wireless communication link to a remote service for any necessary higher level feature extraction and for matching based on the first and second sets of lower level but not higher level features.”

As to claims 38, 40, and 47, which depend from claim 37, the combination of Wang and Barton does not make obvious the following claimed subject matter:

wherein an iterative loop is performed in which a Kth higher level feature is extracted using the second set of received lower level features, addresses of a stored feature set are searched using the Kth higher level feature, and the addresses of the feature sets of the Kth higher level feature are stored until a unique match is determined, where K is natural number from 1 to a maximum number of higher level features

Thus, all claims 1-9, 12, 16, 17, 22-27, 30, 35, 38, 40, and 47-55 are allowable over Wang in view of Barton.

The Patent Office rejected claims 18-20, 37, 56, and 57 under 35 U.S.C. 103(a) as being unpatentable over Wang, U.S. Patent No. 6,990,453, in view of Barton, U.S. Published Patent Application No. 2002/0072982, and Vetro, U.S. Patent No. 6,490,320.

The above discussion of Wang and Barton applies here.

Vetro is apparently cited by the Patent Office for a teaching of high-level description schemes (col. 4, lines 44-46) in addition to a low-level representation (col. 4, lines 34-38) and SummaryDS (col. 22, lines 30-33). Vetro relates to “delivery systems that adapt information to available bit rates of a network” (col. 1, lines 15-17).

The relevance of Vetro is not understood in light of the currently pending claims. Any higher level features derived by Vetro are passed on as content information CI 302 to the CND manager 330 (column 8, line 60, through column 9, line 9) which is used to determine an optimal transcoding strategy for switchable transcoder 340.

Vetro, like Wang and Barton, does not teach “the extracted second set of lower level but not higher level features over the wireless communication link to a remote service for any necessary higher level feature extraction and for matching based on the first and second sets of lower level but not higher level features” or “ wherein an iterative loop is performed in which a Kth higher level feature is extracted using the second set of

received lower level features, addresses of a stored feature set are searched using the Kth higher level feature, and the addresses of the feature sets of the Kth higher level feature are stored until a unique match is determined, where K is natural number from 1 to a maximum number of higher level features.”

Thus, claims 18-20, 37, 56, and 57 are allowable over these three references, alone or in combination.

It is not understood why claims 38, 40, and 47 were rejected by Wang and Barton only whereas their base claim, claim 37, was rejected by Wang, Barton, and Vetro. The Patent Office on Page 13, lines 9-11, stated that Wang in view of Barton differs from the claimed invention of claim 37 “by not explicitly reciting extracting higher level features from the received lower level features to identify the media corresponding to the media sample.” Since claims 38, 40, and 47 are all dependent from claim 37 and so include the subject matter of claim 37, it is not understood why the three claims dependent from claim 37 would be rejected by fewer references than were used to reject their base claim.

Claims 58-70 were added. These claims are supported by the original claims, Figures 3A and 3B, and paragraphs 0051-0054 and 0060 of the application as filed. For reasons provided for the patentability of claims 1-9, 12, 16-20, 22-27, 30, 35, 37, 38, 40, and 47-57, claims 58-70 are patentable.

The Patent Office is respectfully requested to reconsider and remove the rejections of the claims under 35 U.S.C. 103(a) based on Wang, Barton, and Vetro, alone or in combination, and to allow all of the pending claims 1-9, 12, 16-20, 22-27, 30, 35, 37, 38, 40, and 47-70 as now presented for examination. An early notification of the allowability of claims 1-9, 12, 16-20, 22-27, 30, 35, 37, 38, 40, and 47-70 is earnestly solicited.